International Civil Aviation Organization

The Ninth Meeting of the APANPIRG ATM Sub-Group (ATM/SG/9)

Video Teleconference, 01 – 05 November 2021

Agenda Item 5: ATM Systems (Modernisation, Seamless ATM, CNS, ATFM)

MAIN OUTCOMES OF CNS SG/25

(Presented by the Secretariat)

SUMMARY

This paper presents the recent developments in the CNS area that may be of interest to the ATM Sub-group, under the scope of CNS SG/25 meeting which was held from 18 to 22 October 2021.

1. INTRODUCTION

1.1 The Twenty Fifth Meeting of the Communications, Navigation and Surveillance Sub-group (CNS SG/25) of APANPIRG was held from 18 to 22 October 2021 via video teleconference. The meeting was attended by 215 participants from 23 States/Administrations, 4 International Organizations and some industry partners. CNS SG/25 working papers, information papers, and other resources can be accessed at https://www.icao.int/APAC/Meetings/Pages/2021-CNS-SG-25.aspx .

1.2 A number of contributory bodies of APANPIRG have held their meetings listed below which contributed discussion outcomes to CNS SG/25, and webinars/workshops held to increase awareness and understanding on various topics for the Region to support their planning and implementation. All these activities were held via video teleconference:

No.	Meeting/Seminar/Workshop in 2021
1	SRWG/5 (15-17 March)
2	DAPs WG/4 (29-31 March)
3	SURSG/1 (20-22 April)
4	CRV OG/8 (17-19 May)
5	APA TF/7 (7-9 June)
6	Cyber Security Webinar (14 June)
7	ACSICG/8 (21-23 June)
8	PBNICG/8 (6-8 July – RSO)
9	SWIM Workshop (6-7 July)
10	Implementation of CRV Webinar (20 July)
11	SWIM TF/5 (9-11 August)
12	SURICG/6 (24-27 August)
13	ADS-B Implementation Webinar (1 September)
14	ATMAS TF/2 (14-16 (September)
15	SBAS/GBAS TF/3 (27-28 September)

2. DISCUSSION

Outcome of SRWG/5 Meeting and Frequency Spectrum related Issues

2.1 The space-based VHF frequency compatibility study has commenced in International Telecommunications Union (ITU) Working Party 5B (WP5B) meetings and the ICAO Frequency Spectrum Management Panel (FSMP) is the designated ICAO point of liaison with ITU WP 5B. It was noted that ITU WP5B had requested for technical information pertaining to aircraft VHF and the future space-based VHF system for the purpose of the compatibility study for space-based VHF (WRC-23 Agenda Item 1.7). ICAO secretariat would be the point-of-contact to track and monitor and to take the suggestions for improvement as well as concerns on the space-based VHF issue.

2.2 The agenda items for the International Telecommunication Union (ITU) World Radiocommunication Conference 2023 (WRC-23) was discussed in SRWG/5 including points of aeronautical interest and provided the ICAO Position for these agenda items. The ICAO Secretariat presented them again in CNS SG/25 with highlight on space based VHF COM, RPAS C2 Link and sub orbit vehicles. Member States were invited to consider the ICAO Position when developing State's position for WRC-23 and to support the ICAO Position during WRC-23.

2.3 An overview of the frequency coordination process in the APAC Region and the administrative measures implemented to improve the efficiency of the current process via the adoption of Conclusion *CNS SG/24/8(SRWG/4/3) Establishment of a list of focal points responsible for the operation of Frequency Finder in States* were presented by the ICAO Secretariat.

2.4 The initial draft of the regional guidance material on aeronautical frequency spectrum management for APAC States was reviewed in the meeting.

2.5 The ICAO secretariat presented a plan to simulate the VHF COM for APAC in 2030 per *Conclusion CNS SG/24/7(SRWG/4/2) – Simulation of VHF COM Frequency requirements for next 10 years.* A new round of simulation for VHF COM frequency assignment based on new operational requirements of States to 2030 as necessary would be conducted. A State Letter has been issued and responses from 7 States received.

2.6 CNS SG/25 reviewed the discussion in SRWG/5 on the actions taken in France to mitigate interference into Radio Altimeters systems from 5G/MFCN in the band 3.4-3.8 GHz and the protection of interference to radio altimeters from 5G applications in the Asia-pacific which was presented by Boeing Australia. CNS SG/25 noted that SRWG/5 developed an action item to take necessary follow up action at regional level, to support CAAs working with State’s spectrum regulators to avoid the future safety issues on radio altimeter due to 5G implementation. Furthermore, ICAO issued a state letter with the Subject: Potential safety concerns regarding interference to radio altimeters (Ref.: SP 74/1-21/22), the Member States and Administrations are encouraged to consider as a priority, public and aviation safety when deciding how to enable cellular broadband/5G services in radio frequency bands near the bands used by radio altimeters. The meeting was invited to report to ICAO APAC Regional Office in a timely manner once the interference to radio altimeters by these broadband technologies happens.

2.7 Hong Kong, China shared their observations on potential impacts of departing aircraft on arriving aircraft under runway mixed-mode operation with respect to LOC signal fluctuations. States/Administrations are invited to note the importance of extending protection of ILS CA/SA from 2D (horizontal) context to 3D, especially for LOC. ICAO APAC Regional Office has shared the working paper to secretary of the ICAO NSP for consideration by Conventional Nav-aids and Testing Working Group (CNTWG).

2.8 Civil Aviation Administration of China (CAAC) shared in CNS SG/25 on the progress of the application of Aeronautical Mobile Airport Communications System (AeroMACS) technology in China, which the technology has been deployed in 23 airports in China, and applications based on AeroMACS including D-TAXI and runway intrusion prevention were introduced.

2.9 The ICAO Secretariat presented the information about approval of Annex 10, Volume VI dedicated to the SARPs on the "C2 Link Procedures" and the "C2 Link Systems". It was informed that the first edition of Volume VI to Annex 10 and Amendment 90 to the ICAO SARPs, Annex 10-Aeronautical Telecommunications, Volume V - Aeronautical Radio Frequency Spectrum Utilization were adopted by the Council at the fifth meeting of its 222nd Session on 1 March 2021. The Amendment 90 arosen from the recommendations developed by the RPASP/13 which concerns the specifics of the frequency bands which can be used for the C2 Link. The first edition of Volume VI becomes effective on 12 July 2021 and it will be applicable from 26 November 2026.

Outcome of ACSICG/8 Meeting

CRV Implementation Plan Amendment

2.10 Based on the recommendation of CRV OG/8 and ACSICG/8 on adjusting assigned IP address range in the CRV Implementation Plan for broadcasting space-based ADS-B data, the CNS SG/25 meetings adopted the **Conclusion CNS SG/25/01** (*ACSICG/08/01(CRV/08/01)) – CRV Implementation Plan amendment* . By this conclusion, certain IP addresses are assigned to third party Service Provider (e.g. AIREON LLC providing Automatic Dependent Surveillance - Broadcast data over CRV) depending on Service Providers' technical requirements.

CRV Solution for Pacific Islands and small ANSPs

2.11 With the slow CRV implementation progress by the Pacific Island States and small ANSPs in the region to date, CNS SG/25 meetings endorsed the **Draft Conclusion CNS SG/25/02** *(ACSICG/08/02 (CRV/08/02)) - Implementation of CRV for small Pacific Islands and small ANSPs in the region using CRV Solution, PCCWG SLA Package D.* for further consideration by APANPIRG/32.

Other updates in ACSICG/8 and CRV OG/8

2.12 CRV Landing Page, which provides the overview content to CRV, has been created on the ICAO APAC Website at https://www.icao.int/APAC/Pages/Join-CRV.aspx.

2.13 Expert groups of CRV OG on Service Strategy, Design, Transition and Operations have been established with objectives, various tasks and activities and working methodology to incorporate the outcomes into CRV Operational manual.

2.14 The ATN/AMHS/AIDC implementation table and the CRV implementation table was endorsed by CNS SG/25. ATN/AMHS/AIDC implementation table and the CRV implementation table are provided at **Appendices A and B**.

2.15 AMHS Readiness Table for Supporting IWXXM Traffic updated in the ACSICG/8 meeting was noted by CNS SG/25. It was also noted that while some States are ready to support IWXXM exchange via AMHS, no end users of those States have indicated to plan for system upgrades to receive IWXXM yet.

Outcome of APA TF/7 Meeting

2.16 The Graphical Display on the AIDC implementation and planning status of APAC Region was updated based on the inputs provided to the meeting by States.

2.17 China, India, Indonesia, Lao PDR, Malaysia, Philippines, Singapore and Thailand shared their AIDC implementation plan by different WP/IPs. China informed about China and Laos AIDC Pre-Operational Trials, Hybrid Application of AIDC and OLDI, and application of Electronic Handover Technology between High Level and Low Level Sectors by IPs. India also shared Lessons Learnt in their AIDC Implementation.

2.18 The APA TF/7 meeting reviewed and discussed the total remaining 105 consolidated implementation issues, and the summary of LHD Hot Spots presented in RASMAG/25.

2.19 With the significant achievements made by APA TF since its establishment including the preparation of AIDC Planning Table in the Regional Air Navigation Plan, development of AIDC Implementation and Operations Guidance Document, maintenance of AIDC Issues Report, summary of AIDC focal points, the Implementation Status Chart as well as the sharing of the experiences gained by States/Administration in the challenging process of AIDC implementation, the ToR will be reviewed based on the scope and work may be undertaken by ATMAS TF within available time and resources.

Outcome of SWIM TF/5 Meeting

2.20 A survey on SWIM implementation plan and status of Asia/Pacific Member States was proposed to create a baseline picture of SWIM implementation plan and status within the region. The meeting agreed the views of MET, ATFM and other SWIM users should be included in the response of Asia/Pacific SWIM Implementation Plan and Status Survey. As such, based on the recommendation of SWIM TF/5, CNS SG/25 adopted **Conclusion CNS SG/25/03** (*SWIM TF/5/01) – Asia/Pacific SWIM Implementation Plan and Status Survey*.

2.21 CNS SG/25 reviewed the SWIM TF Work Plan and the Action List, with a wording modification in Section (c) of ToR for SWIM data to be carried "*principally* over CRV". The CNS SG/25 meeting remarked that ToR is a living document which needs to be reviewed in a regular and timely manner. The meeting also reminded the SWIM TF to consider other IP-based network technologies in their forthcoming review on ToR, which CNS SG/25 advised SWIM TF to further consider other modifications proposed to the CNS SG/25 in coming SWIM TF/6 meeting. As such, CNS SG/25 adopted the **Decision CNS SG/25/04** (*SWIMTF/05/02) – Revised SWIM TF Terms of Reference*.

2.22 The meeting discussed an overview of Multi-Regional Trajectory Based Operation (MR TBO) Demo by Japan, Singapore, Thailand, USA, and Canada to validate TBO concept as well as to showcase the TBO operational values and technical capabilities required to support TBO.

2.23 A proof-of-concept (POC) for surveillance data sharing on SWIM is to be conducted in Hong Kong China for States' reference. It was noted that hybrid model has been successfully demonstrated during the SWIM in ASEAN Demonstration in November 2019 and is considered as a suitable infrastructure for SWIM implementation in APAC.

2.24 The *ICAO APAC SWIM Workshop* was attended by 231 participants from 21 States/Administrations, one International Organization, a group of airlines industries and one observer. A total of 13 presentations including one demonstration were delivered by Experts from different parts of the World in the Workshop.

Other Outcomes on Aeronautical Fixed Service

2.25 The ICAO EUR/NAT Office initiated a coordination with ICAO APAC Office on interregional AMHS connection issue to support future AIRM data, such as IWXXM. Current links are listed below:

a. Bangkok-Rome AFTN
b. Beijing-Khabarovsk AFTN
c. Fukuoka-Moscow AFTN
d. Singapore-London AMHS

2.26 CNS SG/25 noted that Singapore would continue to provide this bilateral link to maintain the inter-connection between APAC and EUR/NAT region. The Rome-Bangkok AMHS connection is waiting for the readiness from the Rome side for the AMHS transition, and Thailand (AEROTHAI) commissioned one MPLS and tested the inter-operability between AMHS systems. China, Japan and Russia are interested in switching to AMHS exchange between Beijing and Khabarovsk, and between Fukuoka and Moscow, the transition to AMHS of these two connection is expected as soon as possible, once Russia joins the CRV network.

Outcome of PBNICG/8 Meeting

2.27 The ICAO Secretariat presented global PBN implementation status as available in ICAO iSTARS. It was informed that regarding key requirement of ICAO Assembly Resolution A37-11, the implementation of approach procedures with vertical guidance (APV) for all instrument runway ends by 2016, the APAC Region was behind global achievement. However, implementation of PBN SID/STAR was above the global implementation status in Table below.

March 2021	LNAV(including LNAV only)	APV		PBN SID	PBN STAR
		LNAV/VNAV	LPV		
Global (%)	71.4	59.4	34.4	49.4	44.8
Asia/Pacific (%)	57.5	47.1	0	71.6	68.8

2.28 The Secretariat presented the implementation status of the regional transition plan for RNP APCH chart identification from RNAV to RNP, Asia/Pacific Regional Transition Plan for RNP APCH Chart Identification from RNAV to RNP as adopted by APANPIRG/30 vide Conclusion APANPIRG/30/14. The Secretariat reminded the States about the target date as November 2022 for RNP transition.

2.29 ICAO informed that the issue about the discrepancy in the list of international airports in iSTARS and APAC Air Navigation Plan (ANP) was discussed with ICAO HQ and it was agreed that ANP to be used as a reference for a number of international airports. This issue was also discussed at AOP SG/4 and APANPIRG/31, States have been urged to update their list in ANP Vol-I & Vol-II. The ICAO Secretariat informed the meeting about the progress of each action item, and the meeting agreed to close both items after deliberations.

Outcome of GBAS/SBAS ITF/3 Meeting

2.30 The ICAO Secretariat informed the meeting that a GBAS-SBAS Information Sharing Platform had been created on the APAC website for benefit of all States. This platform contains all those reference documents required for the implementation of GBAS/SBAS listed there with applicable links.

2.31 The ICAO Secretariat presented a summary of Amendment to Annex 10 - Vol-I to include DFMC GNSS & SBASs, as well as Galileo & BDS Standards, to be applicable from 2 Nov 2023. This will help States to plan their GBAS/SBAS Implementation. This amendment will also allow some flexibility in the location of GBAS system in an airport.

2.32 The Co-Chairs reviewed the GBAS safety assessment guidance document related to anomalous ionospheric conditions and identified items to be updated. States were requested to nominate members to constitute an expert group for updating this document.

2.33 A framework of guidance reference for the implementation of GBAS/SBAS developed by the Co-Chairs was presented, which is a high level framework of guidance reference document on the implementation process for GBAS/SBAS was introduced. The framework will be taken as a reference for the task force expert group to draft the guidance document for the Region.

2.34 The Secretariat presented about GBAS/SBAS Flight Procedure Design Overview to describe the differences of these procedures vis-a-vis conventional procedures. The Action List of the task force was discussed, with description, relevance and priority being assessed by the meeting.

Outcome of Navigation-related Discussions

2.35 China presented the status of the BeiDou Navigation Satellite System (BDS) standardisation activities in ICAO and the BDS application practices in search and rescue in civil aviation, including the BDS SARPs development and validation in ICAO Navigation Systems Panel (NSP), and the DFMC GNSS standardisation in civil aviation. China informed certain GBAS ground stations were upgraded to be compatible with GPS, Galileo, and BDS. BDS has also been put into search and rescue. 20 aircrafts were fit with BDS tracking and positioning devices, and all China's civil aviation fleet is planned to support BDS DFMC GNSS by 2025.

2.36 The ICAO Secretariat presented the State Letter Ref.: AN 7/62.1.4-21/41 dated 6 July 2021 regarding the Proposals for the amendment of Annex 10, Volume I to : a) support the introduction of dual-frequency, multi-constellation (DFMC) global navigation satellite system (GNSS) by adding provisions for additional frequencies of operation for the global positioning system (GPS), the global navigation satellite system (GLONASS) and the satellite-based augmentation system (SBAS), and by introducing provisions for the new BeiDou Navigation Satellite System (BDS) and Galileo system; and b) support ionospheric gradient mitigation for the ground-based augmentation system (GBAS). This proposed amendment to Annex 10, Volume I is envisaged for applicability on 2 November 2023.

2.37 China introduced a new method for analysing the operational quality of ILS by comparing to flight airborne DAR (Digital ACMS Recorder) data. China introduced their ILS operation quality monitoring platform, which can monitor key parameters of LOC and GP in real time and discover hidden hazards in daily flights. China shared ILS operational problems and suggestions found by this research.

Outcome of Flight Inspection-related Discussions

2.38 The 11th edition of the updated Catalogue of Asia and Pacific Flight Inspection and Flight Validation Service Providers were presented in CNS SG/25 and adopted as **Conclusion CNS SG/25/05 –** *The Catalogue of Asia and Pacific Flight Inspection and Flight Validation Service Providers*. The last update in 10th edition of the Catalogue was published in April 2018. The updated Catalogue will be uploaded on ICAO APAC e-doc portal soon and Member States will be informed by a State Letter.

2.39 China and Hong Kong China proposed to update in Flight Inspection Guidance Material **(**FIGM) on the frequency for flight inspections of surveillance radar systems, by supplementing the frequency for flight inspections of Primary Surveillance Radar and Secondary Surveillance Radar (PSR/SSR) in the document. Some other minor amendments, including the latest guidelines on Flight Inspection periodicity considerations for radio navigation aids and the glossary of FIGM, are also proposed to be made. CNS SG/25 hence adopted **Conclusion CNS/SG/25/06** - *Update of Flight Inspection Guidance Material (FIGM) for APAC Region*.

Outcome of SURICG/6 Meeting and Surveillance related Issues

Interrogator Code (IC) Planning

2.40 The CNS SG/25 reviewed the proposal to amend formerly adopted three APANPIRG Conclusions related to II codes and extend the consideration to the use of SI codes, including Conclusions APANPIRG/19/40, APANPIRG/20/56 and APANPIRG/20/57. As such, the **Draft Conclusion CNS SG/25/07** *(SURICG/6/1) (Draft Conclusion DAPs WG/4/1, Draft Conclusion DAPs WG/4/2, Draft Conclusion DAPs WG/4/3) - Interrogator Code (IC) Planning and Coordination* was adopted by CNS SG/25 for consideration in APANPIRG/32. In such connection, the Table for SSR Mode S Interrogator Code Coordination was reviewed.

2.41 The ICAO Secretariat provided latest updates about Mode S II codes coordination in the APAC Region. An ongoing discussion on allocation of II codes 14 and 15 with matching SI codes was shared. States were encouraged to provide updates and coordination with ICAO APAC Regional Office for updating the SSR II code list through appropriate focal points to eliminate duplicated II code implementation in overlapped coverage at boundary areas.

2.42 As Doc 9924 Aeronautical Surveillance Manual does not contain sufficient information to help APAC region to plan the implementation of II and SI mixed code environment, a small working party was formed in DAPs WG/4 to amend the Doc 9924 to provide necessary guidance material. A proposal was submitted to the Surveillance Panel- Aeronautical Surveillance Working Group (SP-ASWG) to initiate the review. DAPs WG would continue work on this matter in parallel with the Surveillance Panel with the view to improve current guidance in Appendices H and J of Doc 9924.

Transition to II and SI Mixed Code Operation

2.43 The CNS SG/25 reviewed the strategy of transition from II code to II and SI mixed code proposed by DAPs WG/4 and endorsed by SURICG/6 that States with Mode S radar capable of performing II/SI mode operations are encouraged to transit from II code to II and SI mixed code, so as to ease the shortage of II codes. States planning to perform the transition shall coordinate with ICAO APAC Regional Office to obtain the SI codes. As such the **Draft Conclusion CNS SG/25/08** *(SURICG/6/2) (DAPs WG/4/4) - Transition from II code to II and SI mixed code* was adopted by the CNS SG/25 for consideration in APANPIRG/32.

Roadmap for Mode S Implementation

2.44 The CNS SG/25 reviewed the revised Regional Roadmap proposed by DAPs WG/4 and endorsed by SURICG/6. The **Draft Conclusion CNS SG/25/09** *(SURICG/6/3) (DAPs WG/4/5) - The APAC Regional Roadmap for Mode S Implementation* was endorsed by the CNS SG/25 for consideration in APANPIRG/32. The meeting noted that the implementation of Conspicuity Code will need the collaboration between Mode S radars and ATM automation systems.

2.45 CNS SG/25 noted the outcome of the Survey on Current use and Future planning of Mode S Enhanced Surveillance (EHS) Implementation resulted from an Action Item from Mode S DAPs WG/4. The outcomes of the survey based on response from 12 member states concluded that Member States are not facing any challenges in implementing APANPIRG/31/14 Conclusion. Additionally, the commercial fleet in APAC, North America, and MENA already possess Mode S ELS and EHS Mode S capability.

Mode S DAPs Implementation and Operations Guidance Document (IGD)

2.46 A proposal for revised draft Edition 3.0 of the Mode S DAPs Implementation and Operations Guidance Document (IGD) was endorsed in SURICG/6 for consideration in CNS SG/25. The main amendments include advice to mandating Mode S transponder, other protocols for DAPs extraction, use of parameters in the ATM automation system, Mode S DAPs application examples and identified issues, and Mode S radar parameter information. After review, CNS SG/25 adopted **Conclusion CNS SG/25/10** *(SURICG/6/4) (DAPs WG/4/6) - Mode S DAPs IGD 3.0*.

Regional Supplement to ASTERIX Interface Control Document (ICD)

2.47 EUROCONTROL published the System Area Codes (SAC) for the various regions except for APAC. The DAPs WG/4 meeting proposed the considerations to publish the APAC SAC at the EUROCONTROL website. Additionally, States have their own control over the use of their System Identification Code (SIC) without the need for ICAO APAC to manage. As such, the **Conclusion CNS SG/25/11** *(SURICG/6/5) (Draft Conclusion DAPs WG/4/7 and Draft Decision DAPs WG/4/8) - Revision of the Regional Supplement to ASTERIX Interface Control Document (ICD)* was adopted in CNS SG/25 meeting.

2.48 The ICAO Secretariat presented the recent updates to the Regional Supplement to ASTERIX ICD for APAC Region and introduced the planning criteria and current usage of SAC in APAC region. SURICG/6 noted that current allotments would be enough to cater the actual and planned increase of surveillance sensors and automation systems in the APAC Region.

ToR of Surveillance Study Group and Updates

2.49 CNS SG/25 reviewed the revised ToR of SURSG and adopted by the **Decision CNS SG/25/12** *(SURICG/6/6): Revised ToR of Surveillance Study Group (SURSG).*

2.50 SURICG/6 reviewed a proof-of-concept (POC) for surveillance data sharing on SWIM to be conducted in Hong Kong China which was formerly discussed in SWIM TF/5. The POC was explained by a high-level system block diagram in the paper. SURICG/6 expressed support to the POC and on-going work of the SURSG. In addition, SURICG/6 discussed the proposed Concept of Operations (CONOPS) by Hong Kong China on behalf of SURSG for sharing of surveillance data among multiple parties using platform such as SWIM along with the objective of the CONOPS, so as to solicit suggestions/concerns from SURICG for consideration by SURSG in formulating the CONOPS.

ADS-B Implementation

2.51 CNS SG/25 noted that SURICG/6 reviewed the ADS-B Implementation Status in the APAC Region as provided at **Appendix C**. SURICG/6 reviewed other relevant documents through ad-hoc working groups on ADS-B Data Sharing Implementation Status in the APAC Region and Reports on the Sub-regional ADS-B Implementation Plan/Projects presented by South East Asia (SEA) and Bay of Bengal (BOB) Ad Hoc Working Groups. During the discussion in Ad Hoc Working Groups, some States had shared to the meeting that with the implementation of space-based ADS-B, the original ground-based ADS-B data sharing project would have to be re-evaluated.

2.52 FAA provided a description of two ADS-B avionics issues observed in the USA with DO-260B/ED-102A systems, its details and actions taken by FAA in the paper. SURICG/6 agreed to incorporate these issues in the paper into AIGD for easy reference in this region.

Aircraft Address and Target Identification

2.53 Hong Kong China presented the observation on recurring inconsistencies of ICAO Aircraft Address and Target Identification between ADS-B / MLAT / Mode S data and flight plan for some aircraft flying within Hong Kong Flight Information Region despite repeated effort had been spent to follow up with concerned airlines. Such issues have caused safety implications to ATC operation and induced additional workload to both ATC and to supporting staff for following up with the concerned airlines. As such, **Conclusion CNS SG/25/13** *(SURICG/6/7) - Integrity of ICAO Aircraft Address and Target Identification in ADS-B / MLAT / Mode S Data and Flight Plan* was adopted by CNS SG/25 to urge States/Administrations to proactively follow up with air operators to address such discrepancies.

ToR of SURICG

2.54 SURICG ToR was reviewed in SURICG/6 in the view of integration of SEA/BOB ADS-B WG ToR and presented by draft Decision for consideration of CNS SG/25 which was further adopted in CNS SG/25. The revised SURICG ToR was adopted by CNS SG/25 in **Decision CNS SG/25/14** *(SURICG/6/8): Revised ToR of Surveillance Implementation Coordination Group (SURICG)*.

Other Surveillance-related Outcomes

2.55 The ICAO APAC Webinar on Implementation of ADS-B was successfully conducted on 1 September 2021 via Video Tele-Conference (VTC) using Microsoft Teams. The objectives of the Webinar were to review concepts, benefits of Automatic Dependent Surveillance – Broadcast (ADS-B), and share implementation experiences that include ADS-B mandate, ADS-B data sharing, implementation issues, and measures to support ADS-B operation. The latest ADS-B technologies including space-based ADS-B were also discussed during the Webinar. Total 298 participants attended the webinar and four presentations were delivered during the Webinar.

Outcome of ATMAS TF/2 Meeting and ATM Automation System related Issues

Conspicuity Code

2.56 The ATMAS TF/2 meeting reviewed and agreed that the implementation of conspicuity code (Mode A code 1000) in ATM Automation Systems is necessary to support Mode S operations in the Region, which is stipulated in the APAC Regional Roadmap for Mode S Implementation as adopted in ~~**Draft**~~ **Conclusion CNS SG/25/09.** ATM SG is invited to note on the outcome.

Repository of the ATM automation systems

2.57 To follow up ACTION ITEM 1-1 of ATMAS TF/1: *Develop a table to list the current ATMAS status for all states for this task force to establish a repository of the ATM automation systems implemented by States*, a draft Table of Current ATMAS Status was proposed to ATMAS TF/2 for all States and invited States/Administrations to review and provide inputs to this regional repository. The meeting suggested that the table should make reference to the revised version of the ATMAS IGD and agreed to create an ad-hoc group to consider the suggestions provided by the meeting and work out a revised version of the table before conduct a survey. ATM SG is invited to note and consider contribute the input after the draft has been endorsed.

Automation System Problem Reporting Database

2.58 The feasibility of expanding the current ADS-B Avionics Problem Reporting Database (APRD) to cover the report and sharing of ATMAS-related problems by States/Administrations in APAC region was studied. Hong Kong China provided a detailed proposal to expand the existing APRD with pages, and concluded that it is technically feasible and cost-effective to implement ATMAS PRD by leveraging the framework and hardware resources of APRD with no additional hardware resource requirement. The ATMAS TF/2 meeting agreed to create an ad-hoc group to further progress the development of ATMAS PRD and consider including AIDC implementation issue as well. ATM SG is invited to note and consider report ATM Automation System and AIDC related issues in this Problem Reporting Database.

ATM Automation System Implementation and Operations Guidance Document

2.59 Following the conclusion of ATMAS TF/1, the framework of Recommended Functions and Performances of ATM Automation System (RFAP ATM AS) Edition 0.0, which was led by China, Hong Kong China and Singapore in preparing, had been adopted. The completed draft guidance document was sent to Member States/Administrations on 6 August 2021 for review, China revised the draft guidance document according to the comments and additional materials received. In order to align with the naming convention of other IGDs for APAC, Hong Kong China suggested to adopt "Air Traffic Management Automation System Implementation and Operations Guidance Document (ATMAS IGD)" instead of the original document name Recommended Functions and Performances of ATM Automation System (RFAP ATM AS) as the official name. The meeting agreed that the advance draft of ATMAS IGD to be taken forward to seek further comments and inputs from States and that the ICAO APAC Regional Office should issue a State Letter to circulate the advance draft of ATMAS IGD to States/Administrations, who should provide feedback within one month after receiving the State Letter.

Dissolution of APA/TF

2.60 The CNS SG/25 adopted the **Decision CNS SG/25/16** *(ATMAS TF/2/1 (APA TF/7/1)) - Dissolution of APA/TF* as most of the tasks outlined in the ToR have been achieved and the completion of residual part of action items will be undertaken by ATMAS/TF.

2.61 After dissolution of the APA TF, the ongoing APAC regional AIDC implementation work will be taken up by ATMAS TF while ACSICG would handle communications related issues. In order to integrate APA TF ToR into ATMAS TF ToR, the revised ATMAS TF ToR proposed by the ATMAS TF/2 was adopted by CNS SG/25 as **Decision CNS SG/25/17** *(ATMAS TF/2/2) – Revised ATMAS/TF Terms of Reference*.

Other Updates from States

2.62 China introduced the industry standards document MH/T 4029.3 "Civil Aviation Air Traffic Control Automation System - Part 3" to solve the problem of data synchronisation and interaction between ATM automation systems. ATMAS TF/2 agreed that information on the MH/T 4029.3 should be translated into English by China first for better understanding by other Member States/Administrations before conducting a demand survey on such standards if needed.

2.63 Singapore presented the concept of Open ATM as future ATM development trends and explained the benefits comparing to the original ATM Automation Systems. The meeting was informed that Singapore and the industry are working on exploration of Open ATM together.

2.64 China introduced the research and practice of using Mode S downlink aircraft parameters (DAPs) which enhances the safety net of ATMAS based on trajectory prediction, detects air-ground inconsistency, and reduces the instruction deviation events caused by human factors. The existing problems of DAPs were summarised, such as BDS SWAP should be considered to avoid nuisance and false alerts.

2.65 Hong Kong China informed CNS SG/25 that with the implementation of enhanced Wake Turbulence Separation (eWTS) scheme for arrival traffic of Hong Kong International Airport (HKIA), an Approach Spacing Tool (AST) is being implemented at the HKIA to assist controllers in handling final approach operation under eWTS scheme while improving consistency in delivering the arrival traffic according to the intended runway capacity. ATMAS TF/2 noted that the relevant design considerations of AST have been incorporated into the ATMAS IGD.

Regional CNS-related Requirements

2.66 CNS SG/25 reviewed the Regional CNS requirements specified in the three Volumes of ICAO APAC e-ANP, Seamless ANS Plan (Version 3.0, November 2019) and discussed relevant updates on National Air Navigation Plan (NANP). The meeting participants were invited to review all CNS-related information affecting their administration in the e-ANP and provide feedback to ICAO APAC Regional Office to update as necessary. States/Administrations are also invited to formulate their NANP to comply with commitments to Beijing Declaration by 2022. Member States/Administrations were requested to provide updates in a timely manner for State's CNS-related information and requirements in these documents aforementioned.

2.67 The ICAO Secretariat informed that for e-ANP amendments, Member States are no longer constrained by update cycles as it was for former Doc 9673. At present, the ICAO Secretariat manage amendments submitted by Member States in PfA format. Amendments may be processed and incorporated in the e-ANP at any time. If the part that CNS is amending has elements in other domains, there would be automatic coordination between the sections internally before submitting a PfA by ICAO Secretariat. For ATM SG's concern, The Chair of CNS SG invited the ICAO Secretariat to carry out the same review on e-ANP volumes in ATM aspects.

2.68 CNS SG/25 noted that ATM/SG/9 would consider **Draft Conclusion ATM/SG/9-X**: *National Air Navigation Plan Reporting Form* and subsequent adoption of APANPIRG which reports the implementation progress on various Basic Plan Elements (BPEs) in the Form.

2.69 There were certain Member State(s) requested CNS SG/25 to consider modifications in deadlines of Beijing declaration commitments due to current challenging situation. The meeting considered that Member States may put up the proposal for modifications in deadlines set by Beijing declaration to APANPIRG/32.

Review Status of CNS Deficiencies

2.70 The list of Air Navigation Deficiencies in the CNS field was reviewed in CNS SG/25. The only outstanding issue was related to unreliability of AFS communication between Afghanistan and Pakistan. The ICAO Secretariat invited the meeting, particularly BBIS States including Thailand and India to implement CRV as soon as possible to provide convenient connections to BIS States.

Cybersecurity of CNS/ATM systems

2.71 The ICAO Asia Pacific Regional Cybersecurity Webinar was held on 14 June 2021 via VTC. The Webinar was attended by 317 participants from 26 States/Administrations, 6 International Organizations and 2 Technology/Solutions providers (Nokia and Thales).

2.72 ICAO Headquarter introduced the information security requirements for exchange of information over IP from PANS-IM and information security framework aspect. The meeting was informed about the ICAO provision on draft PANS-IM, information service, and guidance material. The requirements of the information security framework were shared including scalable, minimum requirements to ensure trust, common practices based on NIST and ISO, etc. Furthermore, the scope and layered approach of information security framework were elaborated with emphasising on the IPv6 dedicated block of addresses and the impact of the loss of information security on safety.

Application of New Technologies

2.73 China informed that their Unmanned Aerial System (UAS) application research team has been developing a leading and practical PAPI flight inspection technology and explained the prototype of the UAS-Based PAPI Flight Inspection System. 13 trial flights had been carried out to test the UAS plus the payload's functions and performance, evaluate the technology concept, verify the mission module, and integrated system at both plain and plateau airports. Despite limits of the prototype were identified, the UAS-based PAPI inspection technology has great potential to benefit both the flight inspection service provider and the airports. While there could be natural limitations such as distance to runway and wind speeds that restricted the type of flying objects, China envisaged a greater applicability in the future in calibration of equipment in addition to current ILS, VOR, DME, NDB, ADS-B and PAPI through working with various parties such as regulatory bodies.

2.74 Hong Kong China also shared their experience in making use of advanced computer modelling to proactively develop integrated safeguarding surfaces for CNS equipment, aerodrome and flight procedures, and publish them under a regulatory framework to uphold flight safety while minimising constraints to infrastructure/building developments to cope with the pressing needs for lands for developments in the Hong Kong territories. States/Administrations were encouraged to be fully aware of the potential risks induced by the protrusion of safeguarding surfaces and take proactive steps to engage advanced computer modelling to enhance protection of their CNS equipment operation while facilitating infrastructure/building developments.

2.75 China informed CNS SG/25 that CAAC published the first technical specification of fixed-wing/hybrid-wing UAS-based civil aviation flight inspection system in September 2020, as a big move of the standard establishment plan for UAS-based flight inspection technology and application. The issued standard specifies essential functions, performance requirements, system components, antennas, and requirements of the core units, including inspection receiver, signal acquisition unit, evaluation and processing unit, etc. as well as requirements for tag, documentation, transportation, and storage.

Discussion on ATM related issues

2.76 Key outcomes from the technical working groups established under the oversight of the Air Traffic Management and Regional Airspace Safety Monitoring Advisory Sub-Groups of APANPIRG, and information relevant to CNS Sub-Group were reviewed in CNS SG/25.

~~2.77~~ The SAIOACG/10 and SEACG/27 presented the survey conducted to determine which ATC separation standards were being applied within the Asia/Pacific Region, in accordance with the provisions of the Asia/Pacific Seamless ANS Plan. The SAIOACG/10 and SEACG/27 meeting agreed to form the **Draft Conclusion SAIOACG/10 and SEACG/27-1:** *Implementation of Efficient ATS Horizontal Separations and Transfer of Control Aircraft Spacing* and invited CNS SG/25 to discuss. CNS SG/25 meeting deliberated and supported the proposed draft conclusion and noted that the draft conclusion will be further endorsed by ATM/SG/9 and APANPIRG/32 meeting.

Updates of ICAO Secretariat

2.78 The ICAO Secretariat summarised the impact of COVID-19 on CNS works in 2021, and informed about alleviations to the Standards of the Annexes and its associated system named COVID-19 Contingency Related Differences (CCRD) and Roadmap to OPS Normal (icao.int). It was added that Flight inspection periodicity considerations for radio navigation aids is provided under Air Navigation Services section at https://www.icao.int/safety/OPS/OPS-Normal/Pages/AN-Services.aspx, States/Administrations were encouraged to send representatives to join meetings taking advantage of virtual platform, and contribute Subject Matter Experts to support webinars on various topics.

3. ACTION BY THE MEETING

3.1 The meeting is invited to:

a) note the information contained in this paper;

b) note the updated ATN/AMHS/AIDC implementation status provided in Appendix A, CRV Implementation Status in Appendix B and ADS-B Implementation Status in Appendix C; and

c) discuss any relevant matters as appropriate.

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